

研究报告

## 沙地樟子松人工林土壤磷素转化的根际效应

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**摘要** 对大青沟自然保护区不同年龄樟子松人工林根际和非根际土壤中不同形态磷素含量和酸性磷酸单酯酶(AP)活性进行了比较.结果表明,樟子松根系活动显著地提高了根际土壤有机碳含量及有机质的C/P比,增强了土壤微生物活动和AP活性,促进了有机磷的可利用性与矿化;显著地降低了土壤pH值,促进了Ca-P的溶解;从而提高了土壤磷素的有效性,促进了有机磷和Ca-P向Fe-P、Al-P的转化.与AP活性的根际效应相反,随林龄增加,樟子松对各形态磷素的根际效应逐渐增强,根际和非根际土壤中各形态磷素的变化趋势基本一致,土壤全磷和有机磷含量逐渐下降,而活性磷含量升高.为了保持土壤有机磷库和磷素的持续供应,必须对地被物予以保护.

**关键词** [樟子松人工林](#) [根际效应](#) [有机磷矿化](#) [土壤酸化](#) [磷素有效性](#)

分类号

## Rhizosphere effects of *Pinus sylvestris* var. *mongolica* on soil phosphorus transformation

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### Abstract

To understand the phosphorus (P) mobilization mechanism of Mongolian pine (*Pinus sylvestris* var. *mongolica*) on a P deficient semi arid sandy soil of northern China, this paper compared the P fractions and acid phosphomonoesterase (AP) activity in the bulk and rhizosphere soils under different age Mongolian pine plantations. The results showed that when compared with the bulk soil, the organic C, labile organic P, and organic C/P ratio increased significantly, microbial and AP activities improved, and organic P mineralization accelerated in the rhizosphere soil. Root activity of the Mongolian pine significantly increased the bioavailability of soil P, and accelerated the shift of organic P and Ca-P to Fe-P and Al-P. The rhizosphere effects on soil P in different forms enhanced with stand age, whereas in adverse on AP activity. The bulk and rhizosphere soil had the similar trend in the dynamics of its P fractions with stand age. Soil total P pool reduced gradually while labile P pool increased with stand age. It should be essential to protect forest floor to replenish soil P pool and guarantee a long term soil P supply.

**Key words** [Mongolian pine plantation](#) [Rhizosphere effects](#) [Mineralization of organic phosphorus](#) [Soil acidification](#) [Soil phosphorus bioavailability](#)

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